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OCR A Level Computer Science

H446 – Paper 1

3

The nature of applications

Unit 2

Systems software and applications generation

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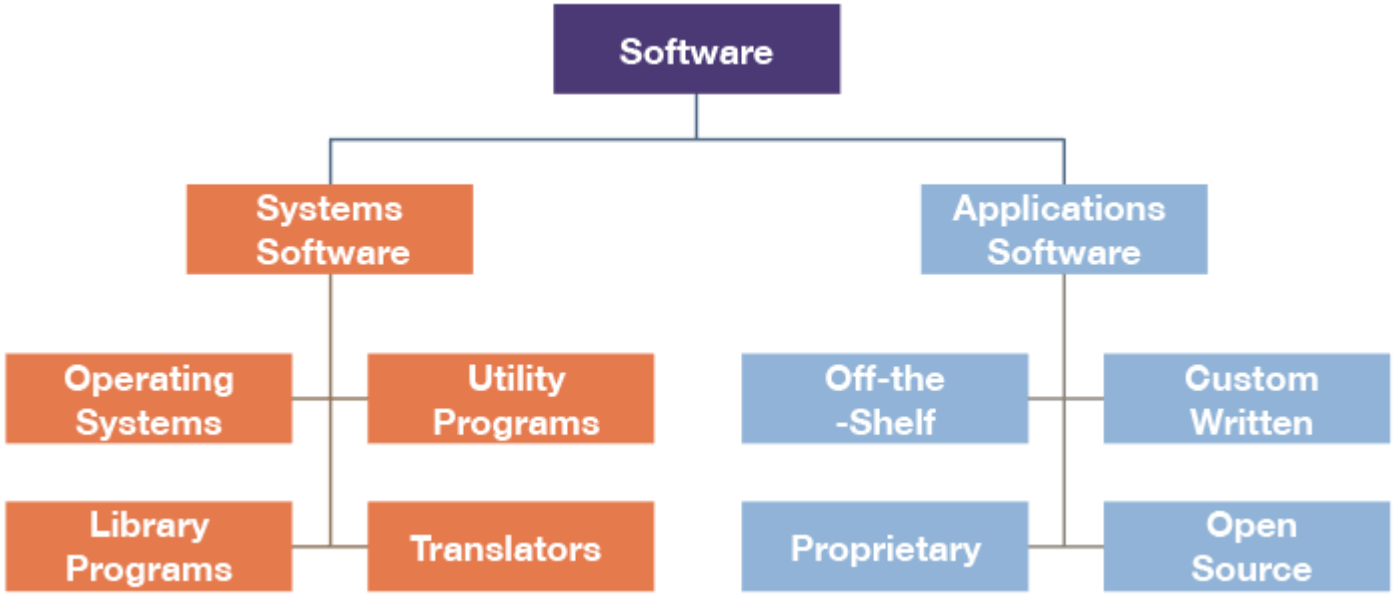
Objectives

- Distinguish between systems software and applications software
- Describe what is meant by a utility program and give examples
- Be able to justify a suitable application for a specific purpose
- Distinguish between open source and closed source software

Categories of software

- Software can be grouped into several categories



Systems software

- Needed by the system to control hardware and
  run applications
  - Operating System
  - Utilities
  - Libraries
  - Translators

Operating System

- We have already discussed Operating Systems in detail in the previous topics
  - What is the purpose of the Operating System?

Operating System

- What is the purpose of the Operating System?
  - Provide a user interface
  - Handle memory management
  - Interrupt handling
  - Processor scheduling to provide ‘multi-tasking’

Utility programs

- Utility programs optimise the performance of the computer and perform useful background tasks
  - Disk defragmenter
  - Automatic backup
  - Automatic updating
  - Virus checker
  - Compression software

Utility: Disk defragmenter

- Large files stored on a magnetic hard drive may be split up across several physical disk locations
- Disk defragmenter reorganises the hard drive so that files are in sequential blocks where possible
- The result is that files can be read more quickly
  - Why does the location of file data on a hard disk affect the speed of access?

Utility: Disk defragmenter

- Suppose files are stored in a section of the hard disk as follows:

- The defragmenter will try to ensure all parts of file A are contiguous by moving other files as necessary

- Why do you think gaps might be present in the first place?

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Utility: Automatic backup

- Data in permanent storage needs to be regularly backed up
  - Why might a business need to use backups?
- Users may forget to do this!
- The process can be automated, specifying:

  Where – portable hard drive, cloud, local server

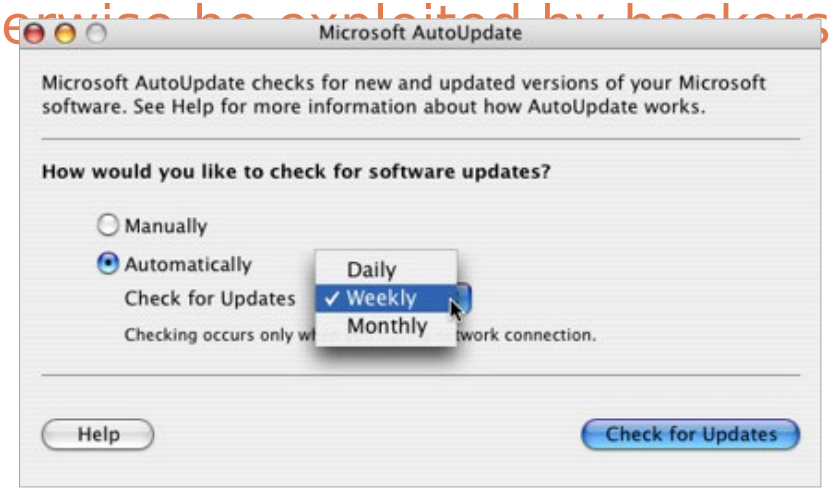
  When – usually when the computer is not in use

  What – which data should be backed up

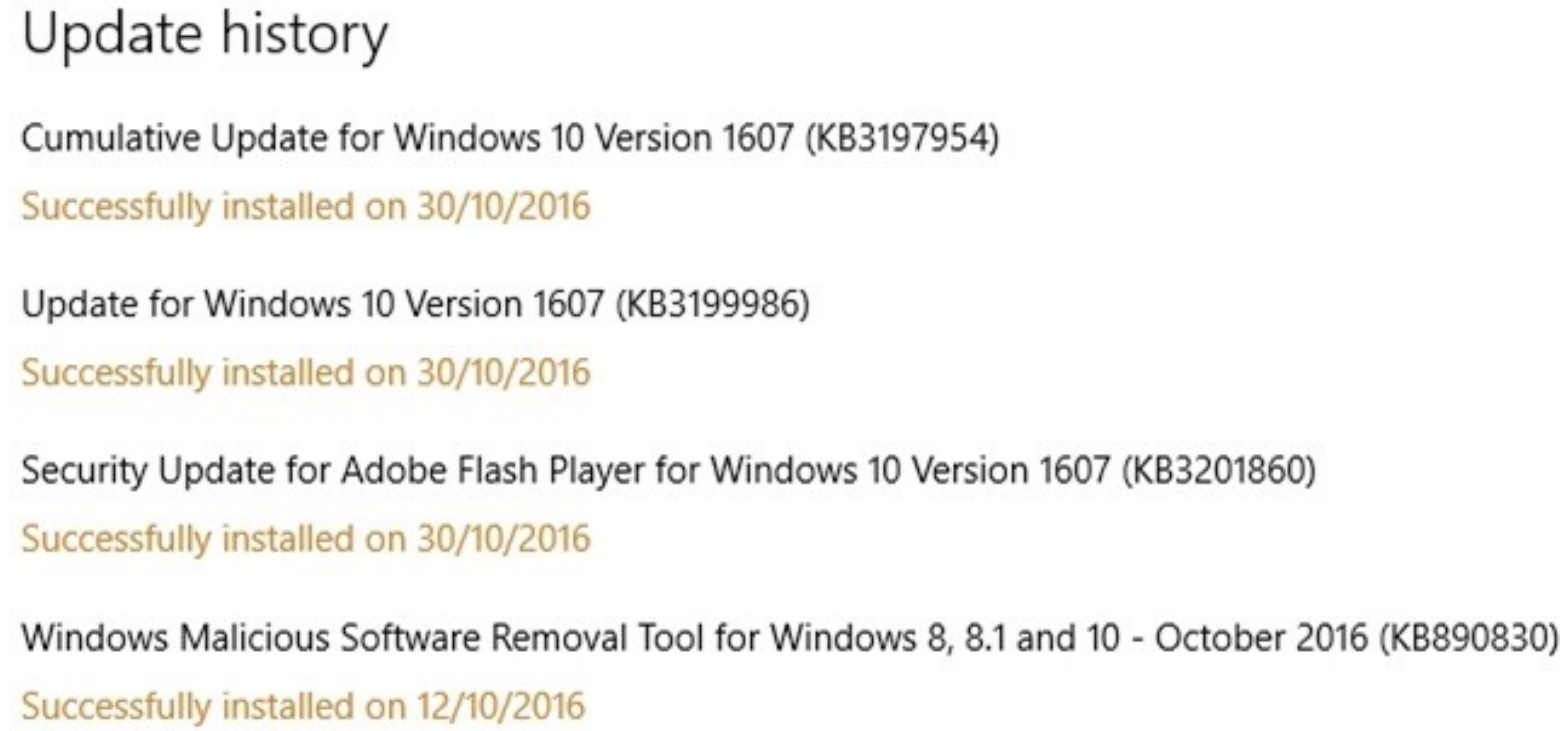
  How – should backups be compressed

Utility: Automatic updating

- Runs in the background detecting software update releases and automatically installing them
  - Some updates add new software features
  - Some important updates fix **security issues** which could otherwise be exploited by hackers

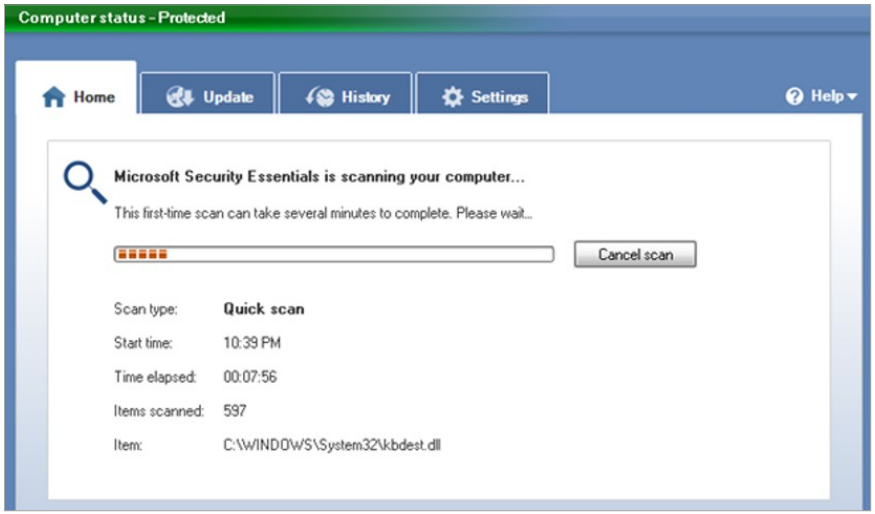

Microsoft AutoUpdate
Microsoft AutoUpdate checks for new and updated versions of your Microsoft software. See Help for more information about how AutoUpdate works.
How would you like to check for software updates?
Manually
Automatically
Check for Updates
Daily
Weekly
Monthly
Help
Check for Updates

Windows automatic update


Update history
Cumulative Update for Windows 10 Version 1607 (KB3197954)
Successfully installed on 30/10/2016
Update for Windows 10 Version 1607 (KB3199986)
Successfully installed on 30/10/2016
Security Update for Adobe Flash Player for Windows 10 Version 1607 (KB3201860)
Successfully installed on 30/10/2016
Windows Malicious Software Removal Tool for Windows 8, 8.1 and 10 - October 2016 (KB890830)
Successfully installed on 12/10/2016

Utility: Virus checker

- Scans permanent storage for viruses by comparing files to known virus definitions
  - May also scan files ‘on access’ as they are opened
  - Must be kept up to date with new virus definitions to be effective

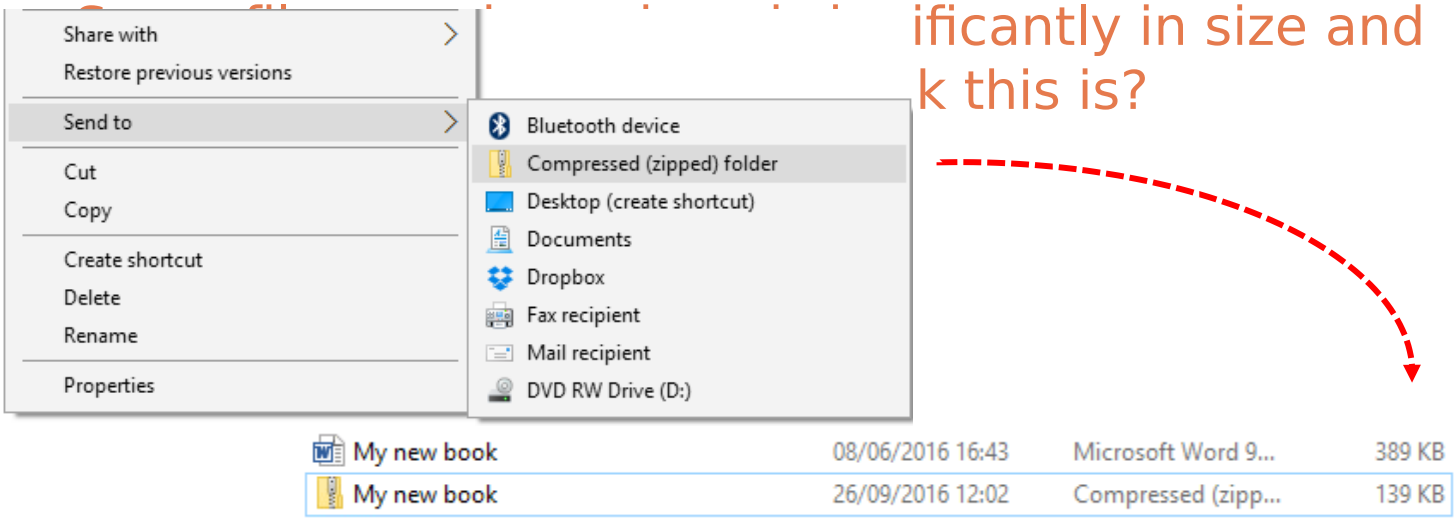


Utility: Virus checker

- Antivirus software uses heuristics – it knows what types of behaviour are likely to be used by a malicious program
- Heuristics can be used to guess which programs or files may contain a virus, based on their behaviour
- Sometimes the virus checker will flag a harmless file as a virus
  - Why do you think this happens?

Utility: Compression software

- We may want to send large files across the internet
- Compression software can reduce the size of files



Worksheet

- Complete **Task 1** on **Worksheet 3**

Libraries and Translators

- Allow programs to use pre-written routines and to be translated into executable code
- Libraries and translators will be discussed in detail in Topic 4

Applications software

- Software that performs a task to benefit the user
- Applications can be divided into categories:
  - General purpose
  - Special purpose
  - Bespoke
- When we talk about ‘apps’ on a phone, this is just short for ‘applications’!

Off the shelf or bespoke?

- Ready made software available to anyone to purchase is known as off the shelf software
  - This is true even if it didn't come from a physical shop!
- Software that is custom created for a specific user is known as bespoke software
- Bespoke software is mostly used by businesses rather than individuals

Open source software

- Open source software allows anyone to access its source code
- The software is open source licensed but free to use
- Anyone may modify the software and sell it, on the condition that the software produced is also
  open source
- Different from freeware - software that is free for anyone to use but the source code is not available

Closed source (proprietary)

- Closed source (or ‘proprietary’) software does not allow access to source code
- Users must pay the person or company who owns the copyright for a license to use the software
- There may be restrictions on how the software is used
  - e.g. it may only be licensed to be used by one person, on one machine, or on a particular physical site

Worksheet

- Complete **Task 2** on **Worksheet 3**

Selecting an application

- What criteria might you use when selecting an application to use?

Selecting an application

- **Functionality** – does it do what I want it to do?
- **Hardware** – will it run on the hardware?
- **Availability** – already exists or specially written?
- **Cost** – how much is it?
- **Reliability** – are there bugs, has it been tested?

Plenary

- Systems software is necessary for the system to operate
- Applications software performs tasks for the user
- Utility programs ensure the system runs smoothly
- Open source software allows free access to the software and its source code
- Closed source software requires users to pay for a licence and source code is hidden

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